REMARKS

This application includes claims 1 and 3. With this paper, claims 1 is amended, none are added and none are canceled. Support for the amendment can be found at least on page 8, lines 16 to 20 of the originally filed specification.

Claim Rejections under 35 USC §103

At page 3, section 2 of the Office Action, claims 1 and 3 are rejected under 35 USC §103(a) as being unpatentable over Suzuki (U.S. Patent No. 5,762,289, Suzuki hereafter) in view of TEIJIN LIMITED (EP 1162227 A1, Teijin hereafter).

Claim 1 recites a roll of a polyvinyl alcohol (PVA) film obtained by winding up the PVA film around a cylindrical core tube. The cylindrical core tube is made of a metallic material and has a surface roughness of at most 100 S, a roundness of 0.01 to 0.2 mm and a cylindricality of 0.01 to 1 mm. The PVA film has a thickness of 20 to 100 μm.

The polyvinyl alcohol (PVA) film of the present invention is useful as a polarizing film for large-size liquid crystal display (LCD) devices such as flat panel television sets. Treatments such as dyeing and drawing are required in order to form the PVA polarizing film. It is important for a polarizing film being able to be dyed and drawn evenly, and accurate drawing properties of the film depend on the quality of the core.

The Applicant has found out that, if the roundness of the core exceeds the maximum value stated in claim 1, i.e. 0.2 mm, the cross section of the core tube approaches an ellipse shape and the core tube fluctuates when the film is being wound on the core. Therefore, wrinkles tend to generate on the film (page 7, lines 1-5 of the instant specification).. Even if the film is wound up wrinkle-free, a core exceeding the above-mentioned roundness limit would cause non-uniform discharge of the film at the time the film is been prepared (i.e. dyed and drawn) as the polarizing film. As a result, unevenness in drawing and dyeing is caused, which leads to a poor productivity of the LCD devices.

As shown in the examples 1-4 of the instant application, rolls of PVA films are prepared by using aluminum core tubes having roundness, cylindricality and surface roughness within the limitations recited in claim 1. The films were then unwound, treated and stretched to produce a polarizing film. The films are free of wrinkles and uneven dyeing and were excellent in the optical properties (transmission and degree of polarization). In production of large size LCD devices, the polarizing film prepared with the process as specified in the application resulted in a high quality a satisfactory yield of the products.

The Office asserts that Suzuki's subject matter of winding plastic films on a core establishes the basis for rejecting claim 1. The Examiner states: "Thus, although not set forth in one of the examples, Suzuki at least suggests a roll of polyvinyl alcohol film obtained by winding up the polyvinyl alcohol film around a cylindrical core tube."

Applicant respectfully submits that winding up the PVA film around a cylindrical core tube can not be construed as a suggestion made by Suzuki. Suzuki does not particularly teach winding a PVA film on a core. Suzuki teaches (col. 3, lines 22-32):

> Illustrative of the film materials are polyesters, such as polyethylene terephthalate (PET) and polyethylene naphthalate (PEN), polyethylene, polystyrene, polyvinyl alcohol, polyvinyl chloride, teflon, triacetyl cellulose, polyvinylidene chloride, nylon, polypropylene, polycarbonate, polyimide, polyamide-imide, polyester imide and the like, and **the core of the invention is particularly effective against polyester films, such as PET and PEN.** In addition, the core of the invention is also effective against papers laminated with a polymer film as mentioned above, a metal foil such as Al.

Even though Suzuki mentions PVA as among a list of materials being able to form a film, he actually teaches that the invention is particularly effective against polyester films, such as PET and PEN. Besides, there is no particular example set forth in Suzuki showing that a PVA film can be successfully wound on a core.

All the examples shown in Suzuki can be summarized in the follow table:

Table 1: Summary of examples in Suzuki

Example	Core Material	Film Material	Film Thickness	Remarks
1	GFRP	PEN	100μm	
2	GFRP	PEN	100μm, 200μm	
3	Aluminum and two types of GFRP	not mentioned	not mentioned	Result with Aluminum core not shown
4	GFRP with non-metallic sleeves	not mentioned	not mentioned	

From the above, it is clear that Suzuki did not perform any test on winding a PVA film on the core of his invention, and there is no result in winding a film (whether PEN or PVA) on a metallic core (Example 3). Only the results with non-metallic GFRP cores are shown and discussed in the disclosure.

As the Examiner has already acknowledged, Suzuki does not disclose a metallic core with the limitations recited in claim 1. In fact, Suzuki never suggested any limitations on the roundness, cylindricality and surface roughness of the core.

There are fundamental differences in hygroscopicity between different kinds of polymers. Hygroscopicity is a property possessed by a material of absorbing or discharging moisture according to circumstances. It is known in the art that the typical hygroscopicity of a PVA film is 5.0% and that of a PET film is 0.2%. The higher the value, the easier it is for the material to be affected by the moisture. The PET film is a hydrophobic resin film that is not generally affected by the moisture. It contains a lubricant that makes it relatively easy to wind wrinkle free around a core. PVA film, on the other hand, is a hydrophilic resin film. It is easily affected by the moisture and absorbs the moisture in the atmosphere. PVA film is harder to wind smoothly around a core and it is easily affected by the surface roughness of the core. From the viewpoint of the winding property, PVA film and PET film are not equivalent. The preparation conditions required for the PVA films are considerably more stringent than that of the PET and PEN films.

PET films are widely used as magnetic record medium, condensers, packaging and printing materials. They are mainly used for processes such as coating and vapor deposition. Generally, properties required for a base PET film as a magnetic record medium include a normal

shape of the wound film, free from unevenness on the surface, even hardness in winding, and free from slacks. The PET film is normally not subject to accurate drawings as is the PVA polarizing film. Therefore, the roundness requirement for a winding core tube for the PET film is not on the same level as that set forth in the present invention.

The Office further asserts that Teijin teaches winding a polyester film on a core having similar limitations as the metallic core in claim 1, and equivalence of PET and PVA as taught by Suzuki makes it possible to combine Suzuki and Teijin to come up with the present invention. The Applicant respectfully disagrees.

As it is shown above, the equivalence of PET and PVA was never established experimentally by Suzuki. The fundamental difference in materials, i.e. the hygroscopicity, makes it difficult, if not impossible, to directly apply a process suitable for a polyester (such as PET or PEN) film to a PVA film without modification.

Teijin teaches rolling up a polyester film. The thickness of the polyester film is characterized in the following passages:

> The thickness of the film is preferably not less than 0.5μm and not more than 20μm, further preferably not less than 3μm and not more than 10μm. A film having a thickness of less than 0.5μm is inferior in a rolling property because the rigidity of the film is extremely low, while a film having a thickness of more than 20μm has high rigidity, therefore they scarcely express the effects of the present invention. [paragraph 0019]

and,

> Also the effects especially remarkably appear on the roll of a film having a thickness of not less than 2μm and not more than 10μm, further preferably not less than 3μm and not more than 8μm, especially preferably of not less than 4μm and not more than 7μm. A film having a thickness of less than 2μm is difficult to be used as the support of a magnetic recording medium, because the rigidity of the film is extremely lowered, while a film having a thickness of more than 10μm is difficult to become the target of the present invention, because the film has a high rigidity and gives a relatively good rolled appearance. [paragraph 0033]

Teijin's teaching indicates that for polyester films with a thickness of more than 20μm, there is no need to specify the roundness and the surface roughness of the core, because the film has a high rigidity that gives a good rolled appearance. Teijin never suggests, either explicitly or implicitly, applying the invention to a roll of PVA film having a thickness of 20μm to 100μm.

On the other hand, the subject matter of Suzuki is a roll of plastic film having a thickness of 10 to 1000μm, particularly 50 to 200μm (col. 3, line 22). Such a film is considerably thicker compared with the films disclosed in Teijin. As taught by Teijin above, the rigidity of the film of Suzuki makes it less sensitive to the core conditions, and it is not particularly effective in applying Teijin's invention in Suzuki. If, indeed, the PVA film were equivalent to the polyester films, as the Examiner asserted, it, too, would not be sensitive to the roundness, cylindricality and surface roughness of the core. However, as demonstrated by the actual examples in the application, it is quite the contrary. The quality of the PVA film depends strongly on the condition of the core and the optimum condition for obtaining a roll of PVA film for a polarizing film is specified in claim 1 of the present invention.

In addition, neither of the references describes or suggests a polymer film being processed and applied as a polarizing film for use in LCD devices. Therefore, it is not possible to expect from the references that the degree of polarization is remarkably improved in the PVA film of the present invention, compared with the control samples wound on the cores having roundness, cylindricality and surface roughness outside the limitations of claim 1.

Claim 1 is amended to include limitations of the film thickness. This amendment further distinguishes the present invention from the cited prior art references. Applicant believes that claim 1 is patentable at least for the reasons presented above.

Claim 3 depends on claim 1. Since claim 1 is believed to be patentable, claim 3 should be allowable as well. Applicant respectfully requests the rejections of claims 1 and 3 under 35 USC §103(a) be reconsidered and withdrawn.

Conclusion

For all the foregoing reasons it is believed that all remaining claims of the application are in condition for allowance, and their passage to issue is earnestly solicited. Applicant's agent urges the Examiner to call to discuss the present response if anything in the present response is unclear or unpersuasive.

Respectfully submitted,

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Date

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